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CARY W. BROOKS General Motors Corporation Legal Staff, Mail Code 482-C23-B21 P.O. Box 300 Detroit, MI 48265-3000			EXAMINER LEUNG, JENNIFER A	
			ART UNIT 1764	PAPER NUMBER
DATE MAILED: 11/26/2003				

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/044,526

Applicant(s)

HERMANN ET AL.

Examiner

J nnifer A. Leung

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-- Th MAILING DATE of this communication appears on th cover sheet with the correspondenc address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 12 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) 20-30 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☒ Claim(s) 1-30 are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election without traverse of Group I-1, claims 1-19, in Paper No. 4 is acknowledged. Claims 20-30 are withdrawn from consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### ***Drawings and Specification***

2. The drawings and specification have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware.

### ***Claim Objections***

3. Claims 1, 10-12, 16 and 17 are objected to because of the following informalities:
- In claim 1, it is suggested to change the pronoun, "it" (line 8), to its referenced noun, for clarity in the claims. Likewise in claim 6 (line 2), claim 16 (line 4) and claim 17 (line 5).
  - In claim 10, "above-mentioned" (line 2) and "above noted" (line 3) should be deleted.
  - In claims 11 and 12, "above-noted" (line 2) should be deleted.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are generally narrative, indefinite and appear to be a literal translation into English from a foreign document, thus rendering the claims difficult to search. It is suggested that the claims be rewritten in order to conform to current U.S. practice.

Regarding claim 1, it is unclear as to where the body of the claim begins. Also, the claim recites both closed and open transitional phrases (i.e., “consists of” in line 4 being closed, “characterized by” in line 5 being open, and “consisting” in line 14 being open). Furthermore, the phrases, “e.g., with an endothermic stage of a reforming unit,” (line 3), and “for example, of fins or bars,” (line 14), are considered vague and indefinite, since it is unclear whether the limitations following the phrases “e.g.” or “for example” are part of the claimed invention. See MPEP § 2173.05(d). Also, “the catalytic combustion of a fuel gas/oxygen mixture” (lines 6-7) lacks proper positive antecedent basis. Also, it is unclear as to the structural limitation applicants are attempting to recite by, “*displays* structural elements” (line 11). Also, it is unclear as to the structural limitation applicants are attempting to recite by, “which structural elements are *if necessary* in rows arranged...” (lines 12-13), since the phrase “if necessary” does not constitute a positive limitation. Also, “the flow direction” (line 12) and “the direction of flow” (line 13) lack proper positive antecedent basis, as the apparatus lacks a point of reference for indicating a flow direction (i.e., upstream, downstream, top, bottom, etc.).

Regarding claim 2, the phrase, “e.g., square, rectangular or trapezoidal,” (line 2) is considered vague and indefinite, since it is unclear whether the limitations following the phrase “e.g.” are part of the claimed invention. Also, it is unclear as to the structural limitation applicants are attempting to recite by, “the reaction gap *displays* an inlet and an outlet” (line 3). Also, “the first and second opposite sides” (lines 3-4) lacks proper positive antecedent basis.

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Also, it is unclear as to the relationship between “a flow direction” recited in line 5, and “the flow direction” and “the direction of flow” recited in lines 12 and 13, respectively, of claim 1.

Regarding claim 3, “the fuel gases” (line 4) lacks proper positive antecedent basis.

Regarding claim 4, “the waveform” (line 2) lacks proper positive antecedent basis.

Regarding claim 5, a broad limitation together with a narrow limitation that falls within the broad limitation in the same claim is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. The present claim recites, “provided at least in one and *preferably* in several places,” (line 3), wherein the narrow limitation follows the term, “preferably”. Also, “the also oppositely positioned third and fourth sides” (line 4) lacks proper positive antecedent basis.

Regarding claim 7, “the catalytic combustion chamber” (line 2) lacks proper positive antecedent basis.

Regarding claim 9, it is unclear as to the structural limitation applicants are attempting to recite by, “the structured sections *display* structural elements,” (line 2).

Regarding claim 10, “the two above-mentioned plates” (line 2) lack proper positive antecedent basis, since “at least two plates” are set forth in claim 1.

Regarding claim 11, “the two above-noted plates” (line 2) lack proper positive antecedent basis, since “at least two plates” are set forth in claim 1.

Regarding claim 12, it is unclear as to the structural limitation applicants are attempting to recite by, “*may be* coated with a catalyst also,” (line 3), since the phrase “may be” does not constitute a positive limitation.

Regarding claim 16, “the reactor” (line 3) and “the outflow channel” (line 4) lack proper

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positive antecedent basis.

Regarding claim 17, “the feeder passages” (line 2) and “the collecting passage/s” (line 2, 4) lack proper positive antecedent basis.

Regarding claim 18, “the two plates” (line 2) lacks proper positive antecedent basis, since “at least two plates” are set forth in claim 1. Also, “the other plate-shaped elements” (lines 2, 4) lack proper positive antecedent basis, and it is unclear as to which structural elements are referred to by these other elements. Also, “the fuel processing system” (lines 2-3) lacks proper positive antecedent basis.

Regarding claim 19, “the combustion chamber” (line 2) lacks proper positive antecedent basis.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2 and 11-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Furuya et al. (JP 06-111838, with machine translation).

Regarding claim 1 (as best understood), Furuya (FIG. 1, 2) discloses an apparatus comprising at least two plates 1, 2 arranged essentially parallel to one another, forming a reaction gap therebetween (i.e., passageway 4), wherein at least one of the plates comprises a catalytic coating (i.e., combustion catalyst 5 coated on plate 2) on the side facing the reaction gap 4, and wherein at least one of the plates (i.e., plate 2) comprises structural elements which extend into

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the reaction gap (i.e., the walls defining passageway 4, perpendicular to plates 2; inherently fins), the structural elements further comprising the catalytic coating 5.

Regarding claim 2, Furuya discloses the apparatus is defined by four sides (see FIG. 7, 11, 12, for example) and comprises an outlet (i.e., hole 25) and an inlet (i.e., not shown in FIG. 7, but inherent of the apparatus, located upstream of hole 25) on opposite sides of the apparatus (see FIG. 7; sections [0034] - [0036]).

Regarding claim 11, Furuya (FIG. 1, 2) further discloses the plates 1, 2 define an endothermic stage or a reforming unit (i.e., passageway 3 with catalyst coating 6) on the side facing away from the reaction gap 4.

Regarding claim 12, Furuya discloses the side of the plates 1, 2 facing away from the reaction gap 4 comprises structural elements (i.e., the walls defining passageway 3, perpendicular to plate 1; inherently fins) having a catalytic coating 6.

Regarding claims 13 and 14, Furuya discloses the inlet (i.e., upstream of hole 25, not shown; FIG. 7) and outlet (i.e., hole 25) communicate with a feed channel and an outflow channel, respectively, arranged in an edge region and extending perpendicular to the reaction gap defined by passageways 21 (i.e., the internal manifolds, illustrated by the open region containing arrows 24; similar to "deep grooves" 53 and 54, as shown in FIG. 11; section [0064]).

Regarding claim 15, Furuya discloses the inlet (i.e., upstream of hole 25, not shown; FIG. 7) communicates with several feed-in passages or feed channels (i.e., the internal manifolds located in each of plates 20, 20a, ... etc. in the multi-layer stack).

Regarding claim 16, Furuya discloses the outlet (i.e., hole 25; FIG. 7) communicates with several collecting passages or outflow channels (i.e., the internal manifolds located in each of

plates **20**, **20a**, ... etc. in the multi-layer stack).

Regarding claim 17, Furuya discloses the feeder passages and collecting passages are rectangular and arranged side by side at equal distances from each other (i.e., rectangular-shaped internal manifolds or "deep grooves" **53** and **54**, equidistant from each other; FIG. 11).

Regarding claim 18, Furuya discloses the plates **1**, **2** are integrally laminated one on top of another to form a stack (see FIG. 2).

Instant claims 1, 2 and 11-18 structurally read on the apparatus of Furuya et al.

6. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Tawara et al. (JP 05-155602, with machine translation).

Regarding claim 1 (as best understood), Tawara et al. (FIG. 2-8, 10A-C) disclose an apparatus comprising at least two plates (septums **7**) arranged essentially parallel to one another, forming a reaction gap therebetween (heating chamber **12**), wherein at least one of the plates comprises a catalytic coating (combustion catalyst **2**) on the side facing the reaction gap, and wherein at least one of the plates **7** comprises structural elements (i.e., wall **100** with wavy plate **102**, or fin/block **104**, or fins as defined by walls of slot **103**; see FIG. 10A-10C; section [0014], [0019]) which extend into the reaction gap, the structural elements further comprising catalytic coating **2** (shown as catalyst coating **101** in FIG. 10A-C).

Regarding claim 2, Tawara discloses the apparatus being defined by four sides (see FIG. 3), the reaction gap **12** comprising an inlet (fuel introduction line **4**) and an outlet (discharge line **6**) on a first and a second opposite side of the apparatus (i.e., a top and a bottom side, respectively, as illustrated).

Regarding claim 3, Tawara discloses the plates **7** comprise a wavelike shape, wherein the



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peaks and valleys forming the longitudinal direction of the shape extend in the flow direction of the gases (i.e., see FIG. 10A; wall **100** comprising wavelike shape **102**).

Regarding claim 5, Tawara (FIG. 3, 4, 6, 8) discloses a device for introducing gas transverse to the direction of flow (i.e., the plurality of fuel feeding pipes **8** with nozzles **9**, for feeding gas in a direction transverse to the flow direction from inlet **4** to outlet **6**), the device provided at several places along at least one of a third and a fourth opposite side of the apparatus (i.e., provided on the front facing side, as illustrated in FIG. 3 and 8).

Regarding claim 6, Tawara discloses the device **8, 9** introduces gas perpendicular to the flow direction of gas through the reaction gap **12** (i.e., best seen in FIG. 4, 8)

Regarding claim 7, Tawara discloses the reaction gap **12** comprises several structured sections (i.e., four structured sections, as defined by the shaded regions in FIG. 8), wherein the device comprises air openings (i.e., openings or nozzles **9**) for each section.

Regarding claim 8, for two consecutive structured sections (i.e., two consecutive shaded regions; FIG. 8), the air openings **9** are *inherently* provided in a region essentially free of structural elements (i.e., as in the embodiment of FIG. 4, the heating chamber **12** comprising catalyst **2** structured like FIG. 10A or C).

Regarding claim 9, as illustrated in FIG. 10A-C, the structural elements bridge the reaction gap width (i.e., between walls **100**) essentially completely.

Regarding claim 10, Tawara discloses the structural elements as shown in FIG. 10A-C define spacers (section [0014]), wherein air openings (i.e., in incorporating the fuel feed pipes **8** and nozzles **9** of FIG. 4 into the embodiment of FIG. 10A or 10C, for example) are *inherently* provided therein.

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Regarding claim 11, Tawara discloses plates 7 define an endothermic stage or reforming unit (i.e., reaction chamber 11; FIG. 3-7) on the side facing away from the reaction gap 12.

Regarding claim 12, Tawara discloses the side of the plates 7 facing away from the reaction gap comprises structural elements (i.e., reaction chamber 11 comprising structural elements as shown in FIG. 10A-C; sections [0014]-[0016]) and a catalytic coating (i.e., reforming catalyst 1).

Regarding claim 13, Tawara discloses the inlet (fuel introduction line 4) communicates with a feed channel arranged in an edge region of the first side, extending perpendicular to the reaction gap 12 (see FIG. 3 and 8, for external inlet manifold communicating with line 4).

Regarding claim 14, Tawara discloses the outlet (discharge line 6) communicates with an outflow channel arranged on the second side, extending perpendicular to the reaction gap 12 (see FIG. 3, for external outlet manifold communicating with line 6).

Regarding claim 15, Tawara discloses the inlet (fuel introduction line 4) communicates with several feed-in passages that guide the fuel/oxygen mixture over the width of the reaction gap 12 (see FIG. 3, 8, for external inlet manifold communicating with line 4, which feeds gas to fuel feed pipes 8).

Regarding claim 16, Tawara discloses the outlet (discharge line 6) communicates with several collecting passages that collect the exhaust gases from the reaction gap 12 at various places along the side (i.e., at four locations along the top side; FIG. 3), the collecting passages feeding the exhaust gas to the outflow channel (see FIG. 3, for external outlet manifold communicating with line 6).

Regarding claim 17, Tawara discloses the feeder passages (communicating with line 4)

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and collecting passages (communicating with line 6) are arranged side by side at equal distances from each other (see FIG. 3, 8), wherein the passages are *inherently* rectangular, as evidenced by the parallel plate 7 configuration.

Regarding claim 18, Tawara discloses the plates 7 are integrally laminated one on top of another to form a stack (see FIG. 3; i.e., *inherently* welded in the case of metal, section [0010]).

Instant claims 1-3 and 5-18 structurally read on the apparatus of Tawara et al.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tawara et al. (JP 05-155602, with machine translation) in view of Patel et al. (US 4,567,117).

Although Tawara is silent as to whether the wavelike shape 102 (FIG. 10A) may comprise a rectangular or square waveform, it would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to select an appropriate waveform for the wavelike shape in the apparatus of Tawara, on the basis of suitability for the intended use, since changes in shape involves only ordinary skill in the art, and furthermore, the selection of

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rectangular or square waveform for a catalytic substrate is conventionally known in the art, as evidenced by Patel et al. (see FIG. 1; catalyst **12** coated on corrugated plate **2**).

8. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tawara et al. (JP 05-155602, with machine translation).

Tawara discloses an example of the apparatus comprising four structured sections (shaded regions; FIG. 8) of combustion catalyst **2** in heating chamber **12**, and four openings for air introduction (via pipes **8**; FIG. 8) into each of the four structured sections on at least one of the third and fourth opposite sides (FIG. 3). However, Tawara is silent as to the apparatus comprising, specifically, three structured section and two openings for air introduction. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select an appropriate number of sections and openings for the apparatus of Tawara, on the basis of suitability for the intended use (i.e., for a given cell capacity), because it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, *In re Aller*, 105 USPQ 233.

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is 703-305-4951\*\*. The examiner can normally be reached on 8:30 am - 5:30 pm M-F, every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on 703-308-6824. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

\*\* As of December 10, 2003, the phone number will be changed to 571-272-1449.

Jennifer A. Leung

November 20, 2003



**HIEN TRAN**  
**PRIMARY EXAMINER**